We claim:

1. A method of determining eccentricity (e) of a hollow billet in the course of rolling, comprising the steps of:

(a) advancing the hollow billet in a direction along a longitudinal axis (L) of the hollow billet past at least one measuring device provided to detect the wall thickness (s) of the hollow billet at a position (z) along its length and at an angular position (ϕ) thereof or a position along its circumference;

(b) approximating a course of the eccentricity (e) of the hollow billet by the course of the wall thickness (s) as a function of the longitudinal coordinate (z) extending along the longitudinal axis (L) of the hollow billet and the angle (ϕ) about the longitudinal axis in accordance with the relationship:

$$e \propto s(\phi, z) = s_0(z) + s_1(z) \cos(\phi + \delta(z))$$

where s_0 is the mean wall thickness of the hollow billet, s_1 is the wall thickness amplitude superimposed on the mean wall thickness and δ is the angular position as a function of the longitudinal coordinate (z); and

(c) upon passage of the hollow billet past said measuring device taking a number of wall thickness measurements, feeding the measured values to a computer, and subjecting the

measured values in said computer based upon said approximation to a Fourier transformation to obtain a functional course of the wall thickness (s) as a function of the longitudinal coordinate (z) and the angle (ϕ) of the form:

$$s(\phi,z) \cong s_0^* + \Sigma s_{i,1} \cos(\phi + 2\pi p_i z + \xi_{i,1})$$

where s_0^* and $s_{i,1}$ are determined Fourier coefficients for the wall thickness of the hollow billet upon summation (i) over the number (n) of Fourier series elements and whereby p_i and $\xi_{i,1}$ are the Fourier coefficients for a pitch of the course of eccentricity and for the starting angular position of the measurements upon summation (i) over the number (n) of Fourier series elements.

2. The method defined in claim 1 wherein the measurements are taken upstream of a rolling mill following an inclined-roll mill.

3. The method defined in claim 2 wherein the measurements are taken at an upstream side of a conti-rolling line.

4. The method defined in claim 2 wherein the measurements are taken at an upstream side of a press-bench rolling line.

5. The method defined in claim 2 wherein the hollow billet is maintained against rotation about said longitudinal axis (L) during taking of the measurements.

6. The method defined in claim 2 wherein the wall thickness of the hollow billet is measured by a laser ultrasound process.

7. The method defined in claim 2 wherein the wall thickness is measured by a tool inserted into said hollow billet.

8. The method defined in claim 7 wherein said tool is a mandrel.

9. An apparatus for determining eccentricity (e) of a hollow billet in the course of rolling, comprising:

a path over which a hollow billet is advanced in a direction along a longitudinal axis (L) of the hollow billet;

at least one measuring device provided along said path to detect the wall thickness (s) of the hollow billet at a position (z) along its length and at an angular position (ϕ) thereof or a position along its circumference whereby a course of the eccentricity (e) of the hollow billet can be approximated by the course of the wall thickness (s) as a function of the longitudinal coordinate (z) extending along the longitudinal axis (L) of the hollow billet and the angle (ϕ) about the longitudinal axis in accordance with the relationship:

$$e \propto s(\phi, z) = s_0(z) + s_1(z) \cos(\phi + \delta(z))$$

where s_0 is the mean wall thickness of the hollow billet, s_1 is the wall thickness amplitude superimposed on the mean wall thickness and δ is the angular position as a function of the longitudinal coordinate (z); and

a computer connected with said at least one measuring device and receiving a number of wall thickness measurements upon passage of the hollow billet past said measuring device , said computer being programmed to subjecting the measured values based upon said approximation to a Fourier transformation to obtain a functional course of the wall thickness (s) as a function of the longitudinal coordinate (z) and the angle (ϕ) of the form:

$$s(\phi,z) \cong s_0^* + \Sigma s_{i,1} \cos(\phi + 2\pi p_i z + \xi_{i,1})$$

where s_0^* and $s_{i,1}$ are determined Fourier coefficients for the wall thickness of the hollow billet upon summation (i) over the number (n) of Fourier series elements and whereby p_i and $\xi_{i,1}$ are the Fourier coefficients for a pitch of the course of eccentricity and for the starting angular position of the measurements upon summation (i) over the number (n) of Fourier series elements.

10. The apparatus defined in claim 9 wherein said at least one measuring device is located at an outlet of a rolling mill.

11. The apparatus defined in claim 10 wherein said rolling mill is an inclined-roll mill.

12. The apparatus defined in claim 9 wherein said at least one measuring device includes an ultrasonic wall thickness measurement unit having a device for launching an ultrasonic signal into a surface of said hollow billet.

13. The apparatus defined in claim 12 wherein said ultrasonic wall thickness measurement unit includes a device for measuring a time interval between two ultrasonic signals including an echo signal produced by launching an ultrasonic signal into said surface.

14. The apparatus defined in claim 13 wherein said ultrasonic wall thickness measurement unit includes a laser and an optical analyzer.

15. The apparatus defined in claim 14 wherein said laser is an Nd:YAG laser.

16. The apparatus defined in claim 13 wherein said optical analyzer is a Fabry-Pérot interferometer.

17. The apparatus defined in claim 9 wherein the measurements are taken upstream of a rolling mill following an inclined-roll mill.

18. The apparatus defined in claim 17 wherein the measurements are taken at an upstream side of a conti-rolling line.

19. The apparatus defined in claim 17 wherein the measurements are taken at an upstream side of a press-bench rolling line.